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10/656,731	09/04/2003	Yoshiaki Tanaka	10844-34US (203067D-1)	4770

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EXAMINER

ROE, JESSEE RANDALL

ART UNIT	PAPER NUMBER
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1742

MAIL DATE	DELIVERY MODE
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05/30/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/656,731

Applicant(s)

TANAKA, YOSHIAKI

Examiner

Jessee Roe

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-58 is/are pending in the application.
- 4a) Of the above claim(s) 11-14 and 23-50 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10, 15-22 and 51-58 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 15 March 2007.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application
- ☐ Other: _____.

DETAILED ACTION

Status of Claims

Claims 1-58 are pending wherein claims 11-14 and 23-50 are withdrawn from consideration.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 15 March 2007 has been entered.

Status of Previous Rejections

The previous rejection of claims 15-18 under 35 U.S.C. 103(a) as being unpatentable over any one of JP 63-266034, JP 63-266035, or JP 63-270437, and further in view of Cole (GB 2028608 A) is withdrawn. The previous rejection of claims 19-22 under 35 U.S.C. 103(a) as being unpatentable over any one of JP 63-266034, JP 63-266035, or JP 63-270437 in view of JP 11-306940 and further in view of Cole (GB 2028608 A) is withdrawn. The previous rejection of claims 51-54 under 35 U.S.C. 103(a) as being unpatentable over any one of JP 63-266034, JP 63-266035, or JP 63-270437 and further in view of Ishioka (JP 403110732) is withdrawn. The previous rejection of claims 55-58 under 35 U.S.C. 103(a) as being unpatentable over any one of

JP 63-266034, JP 63-266035, or JP 63-270437 in view of JP 11-306940, and further in view of Ishioka (JP 403110732) is withdrawn.

Claim Objections

Claims 3-10, 15-22 and 52-58 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The recitation "an alloy thermal fuse" is not recited in independent claim 1 and does not further limit "a material" as stated in independent claim 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parachuri et al. (EP 1,084,790 A1).

In regards to claims 1-2, Parachuri et al. (EP '790) disclose an alloy having approximately 15 weight percent Sn, 55 weight percent Bi, and 30 weight percent In (Eutectic e_4). Because the alloy has these approximate weight percentages, it would be expected that the composition could deviate. Therefore, the alloy composition would

overlap the composition of the instant invention, which would be a prima facie case of obviousness. See MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the desired alloy composition from the composition disclosed by Parachuri et al. (EP '790) because Parachuri et al. (EP '790) disclose the same utility throughout the disclosed ranges. Further, the alloy would have a eutectic temperature of 86°C.

Still regarding claims 1-2, the recitation "A material for a thermal fuse" has been considered, however, because the recitation occurs in the preamble and does not limit the structure of the alloy it has been considered merely a statement of intended use or purpose. See MPEP 2111.02 II.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 63-266034.

In regards to claims 1-2, JP '034 (abstract) teaches fuse compositions that overlap the compositions as claimed in the instant invention. JP '034 teaches a fuse element consisting of a small amount of copper and the balance being **one or more** kinds of metals among lead (Pb), bismuth (Bi), indium (In), cadmium (Cd), antimony (Sb), and tin (Sn). The fuse composition of JP '034 consisting of Cu, Sb, In, Sn, and Bi, does not contain Pb or Cd as required in the amended instant claim 1. The overlapping compositions of JP '034 compared to that of the instant invention are shown in the table below.

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Element	From Instant Claims	JP ('034)	Overlapping range
From Instant Claim 1		abstract	
In	15%-37%	0.01%-30%	15%-30%
Sn	5%-28%	0.01%-40%	5%-28%
Bi	balance	0.01%-50%	26.5%-50%
From Instant Claim 2		(abstract)	
Cu	0.1%-3.5%	0.01%-2%	0.1%-2%
Sb	0.1%-3.5%	0.01%-15%	0.1-3.5%

The ranges disclosed by JP '034 for indium (In), tin (Sn), bismuth (Bi), antimony (Sb) and copper (Cu) are within the ranges claimed in the instant invention.

The Examiner notes that the disclosed composition of the alloy fuse overlaps with the composition of the claimed invention. Therefore, a prima facie case of obviousness exists. See MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed alloy fuse composition from the disclosed ranges of JP '034 because JP '034 teaches the same utility (an alloy fuse composition) throughout the whole disclosed range.

Still regarding claims 1-2 and in regards to claims 3-4, the recitation "A material for a thermal fuse" has been considered, however, because the recitation occurs in the preamble and does not limit the structure of the alloy it has been considered merely a statement of intended use or purpose. See MPEP 2111.02 II. Further JP 63-266034 disclosing using the alloy for a fuse (abstract).

In regards to claims 5-6, the Examiner asserts that the fuse would contain inevitable impurities.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 63-266035.

In regards to claims 1-2, JP '035 (abstract) teaches fuse compositions that overlap the compositions as claimed in the instant invention. JP '035 teaches a fuse element consisting of a specified amount of aluminum (Al) (0.01-10%), gold (Au) or silver (Ag), and the balance being **one or more** kinds of metals among lead (Pb), bismuth (Bi), indium (In), cadmium (Cd), antimony (Sb), and tin (Sn). The fuse composition of JP '035 consisting of Ag or Au, Sb, In, Sn, and Bi, does not contain Pb or Cd as required in the amended instant claim 1. The overlapping compositions of JP '035 compared to that of the instant invention are shown in the table below.

Element	From Instant Claims	JP ('035)	Overlapping range
From Instant Claim 1		abstract	
In	15%-37%	0.01%-30%	15%-30%
Sn	5%-28%	0.01%-40%	5%-28%
Bi	balance	0.01%-50%	28%-50%
From Instant Claim 2		(abstract)	
Ag or Au	0.1%-3.5%	0.01%-10%	0.1%-3.5%
Sb	0.1%-3.5%	0.01%-15%	0.1%-3.5%

The ranges disclosed by JP '035 for indium (In), tin (Sn), bismuth (Bi), silver (Ag) or gold (Au), and antimony (Sb) are within the ranges claimed in the instant invention.

The Examiner notes that the disclosed composition of the alloy fuse overlaps with the composition of the claimed invention. Therefore, a prima facie case of obviousness exists. See MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed alloy fuse composition from the disclosed ranges of JP '035 because JP '035 teaches the same utility (an alloy fuse composition) throughout the whole disclosed range.

Still regarding claims 1-2 and in regards to claims 3-4, the recitation "A material for a thermal fuse" has been considered, however, because the recitation occurs in the

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preamble and does not limit the structure of the alloy it has been considered merely a statement of intended use or purpose. See MPEP 2111.02 II. Further JP 63-266035 disclosing using the alloy for a fuse (abstract).

In regards to claims 5-6, the Examiner asserts that the fuse would contain inevitable impurities.

Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 63-270437.

In regards to claims 1-2, JP '437 (abstract) teaches fuse compositions that overlap the compositions as claimed in the instant invention. JP '437 teaches a fuse element consisting of a specified amount of aluminum (Al) (0.01-10%), copper (Cu), and the balance being **one or more** kinds of metals among lead (Pb), bismuth (Bi), indium (In), cadmium (Cd), antimony (Sb), and tin (Sn). The fuse composition of JP '437 consisting of Cu, Sb, In, Sn, and Bi, does not contain Pb or Cd as required in the amended instant claim 1. The overlapping compositions of JP '437 compared to that of the instant invention are shown in the table on the following page.

Element	From Instant Claims	JP ('437)	Overlapping range
From Instant Claim 1		abstract	
In	15%-37%	0.01%-30%	15%-30%
Sn	5%-28%	0.01%-40%	5%-28%
Bi	balance	0.01%-50%	26.5%-50%
From Instant Claim 2		(abstract)	
Cu	0.1%-3.5%	0.01%-2.0%	0.1%-2.0%
Sb	0.1%-3.5%	0.01%-15%	0.1%-3.5%

The ranges disclosed by JP '437 for indium (In), tin (Sn), bismuth (Bi), copper (Cu), and antimony (Sb) are within the ranges claimed in the instant invention.

The Examiner notes that the disclosed composition of the alloy fuse overlaps with the composition of the claimed invention. Therefore, a prima facie case of obviousness exists. See MPEP 2144.05 I.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed alloy fuse composition from the disclosed ranges of JP '437 because JP '437 teaches the same utility (an alloy fuse composition) throughout the whole disclosed range.

Still regarding claims 1-2 and in regards to claims 3-4, the recitation "A material for a thermal fuse" has been considered, however, because the recitation occurs in the preamble and does not limit the structure of the alloy it has been considered merely a statement of intended use or purpose. See MPEP 2111.02 II. Further JP 63-270437 disclosing using the alloy for a fuse (abstract).

In regards to claims 5-6, the Examiner asserts that the fuse would contain inevitable impurities.

Claims 7-10 and 51-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over any one of JP 63-266034, JP 63-266035, or JP 63-270437 as applied to claims 3-6 above, and further in view of Barry et al. (US 4,451,814), JP 11-306940A and Kawanishi (US 5,982,268).

In regards to claims 7-10 and 51-58, neither JP 63-266034, JP 63-266035, nor JP 63-270437 specify wherein the fuse elements would be connected between lead

conductors or that at least a portion of each lead conductor would be covered with a Sn or Ag film. However, Barry et al. ('814) disclose a thermal fuse having two leads that project from opposite ends of the housing of a sealed chamber that would have a fusible metal alloy within it (abstract), a cylindrical case (Figs. 1 and 2), leads that would have a disk shape (Figs. 1-3), and a fuse element that would be connected to the ends of the disk shaped leads (col. 6, lines 1-18). Barry et al. ('814) further disclose that the materials of the fusible metal alloy would be selected from the group consisting of indium, tin, lead, and bismuth (claim 8). It would have been obvious to one of ordinary skill in the art to modify the alloys of any one of the previously cited references by connecting the fuse element between two lead wires in order to form the thermal fuse, as disclosed by Barry et al. ('814) because Barry et al. ('814) discloses making a thermal fuse from alloys made of indium, tin, and bismuth (claim 8 and abstract).

With respect to the limitation that at least a portion of each lead conductor is covered with a Sn or Ag film in claims 7-10, JP 11-306940-A discloses applying an Sn or Ag film to the surface of lead conductors in order to improve the bonding strength of the lead conductors. It would have been obvious to one of ordinary skill in the art to modify any one of JP 63-266034, JP 63-266035, and JP 63-270437 and further in view of Barry et al. ('814) by applying a Sn or Ag film to the surface of the lead conductors in order to improve the bonding strength of the lead conductors as taught by JP 11-306940-A.

With respect to applying a flux to a fuse element in claims 51-58, Kawanishi ('268) discloses adding a flux to a fuse element for a thermal fuse in order to exert an

activation action on a melted fuse element (col. 3, lines 37-45). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify any one of JP 63-266034, JP 63-266035, and JP 63-270437 and further in view of Barry et al. ('814) and JP 11-306940-A, by adding a flux to a fuse element as disclosed by Kawanishi ('268), in order to exert an activation action on a melted fuse element, as disclosed by Kawanishi ('268) (col. 3, lines 37-45).

Claims 15-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over any one of JP 63-266034, JP 63-266035, or JP 63-270437, and further in view of Barry et al. (US 4,451,814), JP 11-306940A, Kawanishi (US 5,982,268) and Cole (US 4,251,718).

In regards to claims 15-22, neither JP 63-266034, JP 63-266035, and JP 63-270437, Barry et al. ('814), JP 11-306940 A, nor Kawanishi ('268) specify wherein a heating element for fusing off a fuse element would be included in the thermal fuse.

Cole ('718) discloses wherein a resistor would be thermally coupled to a thermal fuse thereby allowing a predetermined amount of heat to cause the thermal fuse to blow (col. 4, lines 1-22).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify any one of JP 63-266034, JP 63-266035, or JP 63-270437, and further in view of Barry et al. ('814), JP 11-306940-A, and Kawanishi ('268), by thermally coupling a resistor to a thermal fuse, as disclosed by Cole ('718), in order to allow for a predetermined amount of heat to cause the thermal fuse to blow, as

disclosed by Cole ('718) (col. 4, lines 1-22).

Claims 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parachuri et al. (EP 1,084,790 A1) in view of any one of JP 63-266034, JP 63-266035, or JP 63-270437.

In regards to claims 3-4, Parachuri et al. (EP '790) disclose an alloy (Eutectic e₄) composition substantially similar to that of the instant invention. However, Parachuri et al. (EP '790) do not specify wherein the alloy would be used as a fuse. JP 63-266034, JP 63-266035, and JP 63-270437 disclose substantially similar alloy compositions to that of Parachuri et al. (EP '790). Therefore, it would be expected that the alloy of Parachuri et al. (EP '790) could be used as a fuse.

In regards to claims 5-6, the Examiner asserts that the alloy disclosed by Parachuri et al. (EP '790) would contain inevitable impurities.

Claims 7-10 and 51-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parachuri et al. (EP 1,084,790 A1) in view of any one of JP 63-266034, JP 63-266035, or JP 63-270437 as applied to claims 3-6 above, and further in view of Barry et al. (US 4,451,814), JP 11-306940A and Kawanishi (US 5,982,268).

In regards to claims 7-10 and 51-58, neither Parachuri et al. (EP '790), JP 63-266034, JP 63-266035, nor JP 63-270437 specify wherein the fuse elements would be connected between lead conductors or that at least a portion of each lead conductor would be covered with a Sn or Ag film. However, Barry et al. ('814) disclose a thermal fuse having two leads that project from opposite ends of the housing of a sealed chamber that would have a fusible metal alloy within it (abstract), a cylindrical case

(Figs. 1 and 2), leads that would have a disk shape (Figs. 1-3), and a fuse element that would be connected to the ends of the disk shaped leads (col. 6, lines 1-18). Barry et al. ('814) further disclose that the materials of the fusible metal alloy would be selected from the group consisting of indium, tin, lead, and bismuth (claim 8). It would have been obvious to one of ordinary skill in the art to modify the alloys of Parachuri et al. (EP 1,084,790 A1) in view of any one of JP 63-266034, JP 63-266035, and JP 63-270437 by connecting the fuse element between two lead wires in order to form the thermal fuse, as disclosed by Barry et al. ('814) because Barry et al. ('814) discloses making a thermal fuse from alloys made of indium, tin, and bismuth (claim 8 and abstract).

With respect to the limitation that at least a portion of each lead conductor is covered with a Sn or Ag film in claims 7-10, JP 11-306940-A discloses applying an Sn or Ag film to the surface of lead conductors in order to improve the bonding strength of the lead conductors. It would have been obvious to one of ordinary skill in the art to modify the method Parachuri et al. (EP 1,084,790 A1) in view of any one of JP 63-266034, JP 63-266035, or JP 63-270437 and further in view of Barry et al. ('814) by applying a Sn or Ag film to the surface of the lead conductors in order to improve the bonding strength of the lead conductors as taught by JP 11-306940-A.

With respect to applying a flux to a fuse element in claims 51-58, Kawanishi ('268) discloses adding a flux to a fuse element for a thermal fuse in order to exert an activation action on a melted fuse element (col. 3, lines 37-45). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Parachuri et al. (EP 1,084,790 A1) in view of any one of JP 63-266034, JP 63-

266035, and JP 63-270437 and further in view of Barry et al. ('814) and JP 11-306940-A, by adding a flux to a fuse element as disclosed by Kawanishi ('268), in order to exert an activation action on a melted fuse element, as disclosed by Kawanishi ('268) (col. 3, lines 37-45).

Claims 15-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parachuri et al. (EP 1,084,790 A1) in view of any one of JP 63-266034, JP 63-266035, or JP 63-270437, and further in view of Barry et al. (US 4,451,814), JP 11-306940A, Kawanishi (US 5,982,268) and Cole (US 4,251,718).

In regards to claims 15-22, neither Parachuri et al. (EP '790), JP 63-266034, JP 63-266035, JP 63-270437, Barry et al. ('814), JP 11-306940A, nor Kawanishi ('268) specify wherein a heating element for fusing off a fuse element would be included in the thermal fuse.

Cole ('718) discloses wherein a resistor would be thermally coupled to a thermal fuse thereby allowing a predetermined amount of heat to cause the thermal fuse to blow (col. 4, lines 1-22).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Parachuri et al. (EP '790) in view of any one of JP 63-266034, JP 63-266035, or JP 63-270437 and further in view of Barry et al. ('814), JP 11-306940-A, and Kawanishi ('268), by thermally coupling a resistor to a thermal fuse, as disclosed by Cole ('718), in order to allow for a predetermined amount of heat to cause the thermal fuse to blow, as disclosed by Cole ('718) (col. 4, lines 1-22).

Response to Arguments

Applicant's arguments filed 15 March 2007 have been fully considered but they are not persuasive.

First, The Applicant argues that the exemplified alloys of JP 63-266034, JP 63-266035, or JP 63-270437 contain Pb despite the fact that the abstracts of JP 63-266034, JP 63-266035, or JP 63-270437 do not require the presence of Pb. The Examiner's position is that even though some embodiments do support this argument, there are also embodiments that do not (i.e. abstracts).

Second, the Applicant argues that because all of the primary references disclose that the alloy material would have a melting point below 700°C, the alloys would not be applicable as a thermal fuse. The Examiner disagrees. With melting points below 700°C, there would be an overlap with the melting points of the alloys of the instant invention.

Third, new grounds of rejection have been applied to claims 7-10, 15-22, and 51-58.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessee Roe whose telephone number is (571) 272-5938. The examiner can normally be reached on Monday-Friday 7:30 AM - 4:30 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JR


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